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TO: Jerry Gilmore

ISS MEMO #794

FROM: George Bukow

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SUBJECT: Reasons Justifying Increase in AGC PIPA Bias
Compensation Range

The following reasons are presented to justify an increase at this time in the AGC PIPA Bias Compensation range.

1. It is advisable to launch with PIPA bias levels set at $>+0.75 \text{ cm/sec}^2$ to eliminate the occurrence of deadzones in PIPA output during flight* due to the null coincidence phenomenon. See ISS Memo #721 attached. The present AGC bias compensation range (2.3 cm/sec^2) is not adequate to permit the use of the above bias levels and still allow adequate adjustment capability to offset unexpected bias shifts.

2. The present PIPA bias compensation is less than half of the PIPA "red line" bias fail number of 5 cm/sec^2 (STG Memo #1256). Thus bias shifts between the present compensation limit and 5 cm/sec^2 cannot be compensated.

3. Random IMU turn-off, turn-on transients can cause bias shifts $>1.85 \text{ cm/sec}^2$. A comprehensive analysis of the frequency of such shifts (MIT/IL Report E-2333) has shown that they occur across approximately 1% of the total turn-off, turn-on sequences. Shifts of this magnitude will frequently fall outside the present compensation range.


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*Operation within the deadzone was very apparent in four out of the six PIPAs in Apollo 10. These PIPAs all had bias values $<0.20 \text{ cm/sec}^2$.